

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Previously Presented). A wireless digital audio music system for spread spectrum communication of an audio music signal from the analog headphone jack connected to a battery powered spread spectrum transmitter and received by a battery powered spread spectrum headphone receiver comprising:

an analog headphone jack from an analog audio music source in communication with a battery powered digital transmitter;

said battery powered digital transmitter converts an analog audio music signal from said existing analog headphone jack to a digital signal using an ADC in communication with an encoder;

said encoder in communication with a channel encoder;

said channel encoder in communication with a digital modulator;

said digital modulator in communication with a spread spectrum communication modulator that utilizes a code generator to create a unique hop pattern for each individual user;

said spread spectrum communication modulator in communication with a transmit antenna that transmits at a radio frequency of approximately 2.4 GHz for receipt by a receiving antenna;

said receiving antenna in communication with a spread spectrum communication demodulator;

said spread spectrum communication demodulator in communication with a receiver code generator and with a digital demodulator;

said digital demodulator in communication with a channel decoder;

said channel decoder in communication with a receiver decoder;

said receiver decoder in communication with a DAC;

said DAC in communication with a low pass filter to pass the analog music signal in the approximate frequency band of 20 Hz to 20 kHz; and

said low pass filter passing analog music signal will be amplified for processing to a speaker headphone set to provide high quality music for listening by a single user wearing the headphones.

Claims 2 – 3 (canceled).

Claim 4 (Previously Presented). A method for battery powered wireless communication transmission and reception of high fidelity audio music between a battery operated digital transmitter and a battery operated digital receiver headphone comprising the steps of:

connecting the plug attached to said battery operated digital transmitter to the existing analog headphone jack of an audio music source;

converting a music audio signal to a digital communication signal using an ADC in communication with an encoder;

encoding the communication signal using channel encoding;

modulating the digital communication signal using a digital modulator;

creating a spread spectrum signal using a code generator to modulate a unique hop pattern for each individual user;

transmitting said spread spectrum signal at a radio frequency of approximately 2.4 GHz;

receiving said spread spectrum signal at said battery operated receiver headphones;

demodulating said spread spectrum signal;

demodulating said digital communication signal;

channel decoding of said digital communication signal;

converting said digital communication signal back to said analog music audio signal using a decoder in communication with a DAC; and

communicating said analog music audio signal to a headphone speaker within the headphone receiver.

Claim 5 (canceled).

Claim 6 (Previously Presented). An audio music digital wireless transmitter for spread spectrum communication of an audio music signal, comprising:

an analog headphone jack from an audio music source in communication with a battery powered digital transmitter;

said battery powered digital transmitter being configured to convert an analog audio music signal from said existing analog headphone jack to a digital signal using an ADC in communication with an encoder;

said encoder in communication with a channel encoder;
said channel encoder in communication with a digital modulator;
said digital modulator in communication with a spread spectrum communication modulator that utilizes a code generator to create a unique hop pattern for each individual user; and

said spread spectrum communication modulator in communication with a transmit antenna that transmits at a radio frequency of approximately 2.4 GHz for receipt by a receiving antenna.

Claim 7 (Previously Presented). An audio music digital wireless receiver for spread spectrum communication of an audio music signal, comprising:

a receiving antenna in communication with a spread spectrum communication demodulator;

said spread spectrum communication demodulator in communication with a code generator configured to create a unique hop pattern for each individual user;

said digital demodulator in communication with a channel decoder;

said channel decoder in communication with a decoder;

said decoder in communication with a DAC;

said DAC in communication with a low pass filter to pass the analog music signal in the approximate frequency band of 20 Hz to 20kHz; and

said low pass filter passing analog music signal will be amplified for processing to a speaker headphone set to provide high quality music for listening by a single user wearing the headphones.

Claims 8 – 9 (canceled).

Claim 10 (Previously Presented). A wireless digital audio music system for spread spectrum communication of an audio music signal from the analog headphone jack connected to a battery powered spread spectrum transmitter and received by a battery powered spread spectrum headphone receiver comprising:

an analog headphone jack from an audio music source in communication with a battery powered digital transmitter;

said battery powered digital transmitter converts an analog audio music signal from said existing analog headphone jack to a digital signal using an ADC in communication with an encoder;

said encoder in communication with a channel encoder that is configured to send encoded symbols that are compatible with a Viterbi decoder;

said channel encoder in communication with [a digital low pass filter;

said digital low pass filter in communication with] a digital modulator;

said digital modulator in communication with a spread spectrum communication modulator that utilizes a code generator to create a unique hop pattern for each individual user;

said spread spectrum communication modulator in communication with a transmit antenna that transmits at a radio frequency of approximately 2.4 GHz for receipt by a receiving antenna;

said receiving antenna in communication with a spread spectrum communication demodulator;

said spread spectrum communication demodulator in communication with a receiver code generator and with a digital demodulator;

said digital demodulator in communication with a Viterbi decoder;

said Viterbi decoder in communication with a receiver decoder;

said receiver decoder in communication with a DAC;

said DAC in communication with a low pass filter to pass the analog music signal in the approximate frequency band of 20 Hz to 20 kHz; and

said low pass filter passing analog music signal will be amplified for processing to a speaker headphone set to provide high quality music for listening by a single user wearing the headphones.

Claim 11 (Previously Presented). An audio music digital wireless receiver for spread spectrum communication of an audio music signal to be received by a battery powered spread spectrum headphone receiver comprising:

a receiving antenna in communication with a spread spectrum communication demodulator;

said spread spectrum communication demodulator in communication with a code generator configured to create a unique hop pattern for each individual user;

said digital demodulator in communication with a Viterbi decoder;

said Viterbi decoder in communication with a decoder;

said decoder in communication with a DAC;

said DAC in communication with a low pass filter to pass the analog music signal in the approximate frequency band of 20 Hz to 20kHz; and

said low pass filter passing analog music signal will be amplified for processing to a speaker headphone set to provide high quality music for listening by a single user wearing the headphones.

Claim 12 (Currently Amended). A wireless digital audio music system for spread spectrum communication of an audio music signal from the analog headphone jack connected to a battery powered spread spectrum transmitter and received by a battery powered spread spectrum headphone receiver comprising:

an analog headphone jack from an audio music source in communication with a battery powered digital transmitter;

said battery powered digital transmitter converts an audio music signal from said existing analog headphone jack to a digital signal using an ADC in communication with an encoder;

said encoder in communication with a channel encoder;

said channel encoder in communication with a digital modulator;

said digital modulator in communication with a spread spectrum communication modulator that utilizes a code generator to create a unique hop pattern for an individual user;

said spread spectrum communication modulator in communication with a transmit antenna that transmits at a radio frequency of approximately 2.4 GHz for receipt by a receiving antenna;

said receiving antenna in communication with a spread spectrum communication demodulator;

a receiver code generator configured to create a unique hop pattern for each individual user;

a 2.4 GHz direct conversion receiver that includes a spread spectrum communication demodulator ~~and a receiver code generator;~~

said spread spectrum communication demodulator in communication with said receiver code generator and with a digital demodulator;

said digital demodulator in communication with a channel decoder;

said channel decoder in communication with a receiver decoder;

said receiver decoder in communication with a DAC;

said DAC in communication with a low pass filter to pass the analog music signal in the approximate frequency band of 20 Hz to 20 kHz; and

said low pass filter passing analog music signal will be amplified for processing to a speaker headphone set to provide high quality music for listening by a single user wearing the headphones.

Claim 13 (Previously Presented). An audio music digital wireless receiver for spread spectrum communication of an audio music signal, comprising:

a receiving antenna in communication with a 2.4 GHz direct conversion receiver, wherein the direct conversion receiver includes a spread spectrum communication demodulator in communication with a code generator, said code generator being configured to create a unique hop pattern for each individual user;

said digital demodulator in communication with a channel decoder;

said channel decoder in communication with a decoder;

said decoder in communication with a DAC;

said DAC in communication with a low pass filter to pass the analog music signal in the approximate frequency band of 20 Hz to 20kHz; and

said low pass filter passing analog music signal will be amplified for processing to a speaker headphone set to provide high quality music for listening by a single user wearing the headphones.

Claim 14 (new). A wireless digital audio system, comprising:

at least one audio source;

at least one digital audio transmitter operatively coupled to said at least one audio source;

at least one audio receiver adapted for digital wireless communication with said at least one audio transmitter and utilizing fuzzy logic to optimize digital signal processing, each of said at least one digital audio transmitter and receiver being configured for code division multiple access (CDMA) communication; and

at least one module adapted to audibly reproduce said processed CDMA signal, said CDMA communication configuration providing a user with independent audio reproduction free of interference from other users or wireless devices.

Claim 15 (new). A wireless digital audio system, comprising:

at least one audio source;

at least one digital audio transmitter operatively coupled to said at least one audio source;

at least one audio receiver adapted for digital wireless communication with said at least one audio transmitter and utilizing fuzzy logic to optimize digital signal processing, each of said at least one digital audio transmitter and receiver being configured for code division multiple access (CDMA) communication;

at least one module adapted to amplify said processed CDMA signal; and

at least one module adapted to audibly reproduce said amplified signal, said CDMA communication configuration providing a user with independent audio reproduction free of interference from other users or wireless devices.

Claim 16 (new). The wireless digital audio system of Claim 15, wherein said at least one signal amplifying module includes at least one power amplifier, said at least one power amplifier being configured to provide a low distortion audio signal output.

Claim 17 (new). The wireless digital audio system of Claim 16, wherein said at least one audible reproducing module includes at least one headphone speaker, said at least one headphone speaker receiving said low distortion audio signal output from said at least one power amplifier.

Claim 18 (new). The wireless digital audio system of Claim 14, wherein said at least one audible reproducing module includes at least one headphone speaker.

Claim 19 (new). A wireless digital audio system, comprising:

at least one audio source;

at least one digital audio transmitter operatively coupled to said at least one audio source, said at least one audio transmitter comprising:

a first analog low pass filter receiving audio output from said at least one audio source;

a digital low pass filter;

an analog-to-digital converter (ADC) operatively coupled between said first analog and digital low pass filters;

a first encoder receiving output from said digital low pass filter and being configured to reduce intersymbol interference (ISI);

a second channel encoder operatively coupled to said first encoder and adapted to reduce transmission errors;

a digital modulator operatively coupled to said second channel encoder; and

a differential phase shift key (DPSK) module receiving output from said digital modulator and being configured for direct sequence spread spectrum (DSSS) communication, said DPSK module transmitting a corresponding DSSS signal;

at least one audio receiver configured for digital wireless communication with said at least one audio transmitter and utilizing embedded fuzzy logic to optimize digital signal processing, said at least one audio receiver comprising:

a band pass filter (BPF) configured to process said transmitted DSSS signal;

a direct conversion module receiving output from said BPF and being configured to capture the correct bit sequence embedded in said processed DSSS signal;

a digital demodulator adapted to process output from said direct conversion module;

a Viterbi decoder operatively coupled to said digital demodulator and generating a corresponding digital output;

a source decoder processing said digital output from said Viterbi decoder and being configured to decode the digital signal encoded by said first encoder;

a second analog low pass filter; and

a digital-to-analog converter (DAC) operatively coupled between said source decoder and said second analog low pass filter, said second analog low pass filter generating an audio output corresponding to the decoded and converted digital signal; and

at least one module adapted to reproduce said generated audio output, said audio output having been wirelessly transmitted from said at least one audio source to a user without interference from other users or wireless devices.

Claim 20 (new). The wireless digital audio system of Claim 19, wherein said BPF is a wideband BPF.

Claim 21 (new). The wireless digital audio system of Claim 19, wherein said modulator is a 64-Ary modulator.

Claim 22 (new). The wireless digital audio system of Claim 19, wherein said demodulator is a 64-Ary demodulator.

Claim 23 (new). The wireless digital audio system of Claim 19, wherein said generated audio output is in the approximate range of 20 Hz to 20 kHz.

Claim 24 (new). The wireless digital audio system of Claim 19, wherein said spread spectrum signal is transmitted at about 2.4 GHz via an omni-directional antenna.

Claim 25 (new). The wireless digital audio system of Claim 24, wherein said spread spectrum signal is transmitted at a power of about 100 milliwatts or less.

Claim 26 (new). The wireless digital audio system of Claim 19, wherein said ADC is a 4-bit analog-to-digital converter.

Claim 27 (new). The wireless digital audio system of Claim 19, wherein said at least one audio source is a portable audio player.

Claim 28 (new). The wireless digital audio system of Claim 19, wherein said at least one audio reproducing module includes at least one headphone speaker.

Claim 29 (new). The wireless digital audio system of Claim 19, wherein said BPF is operatively coupled to at least one antenna configured to receive said transmitted DSSS signal.

Claim 30 (new). A wireless digital audio system, comprising:

at least one audio source;

at least one digital audio transmitter operatively coupled to said at least one audio source, said at least one audio transmitter comprising:

a first analog low pass filter receiving audio output from said at least one audio source;

a digital low pass filter;

an analog-to-digital converter (ADC) operatively coupled between said first analog and digital low pass filters;

a first encoder receiving output from said digital low pass filter and being configured to reduce intersymbol interference (ISI);

a second channel encoder operatively coupled to said first encoder and adapted to reduce transmission errors;

a digital modulator operatively coupled to said second channel encoder;

and

a differential phase shift key (DPSK) module receiving output from said digital modulator and being configured for direct sequence spread spectrum (DSSS) communication, said DPSK module transmitting a corresponding DSSS signal;

at least one audio receiver configured for digital wireless communication with said at least one audio transmitter and utilizing embedded fuzzy logic to optimize digital signal processing, said at least one audio receiver comprising:

a band pass filter (BPF) configured to process said transmitted DSSS signal;

a direct conversion module receiving output from said BPF and being configured to capture the correct bit sequence embedded in said processed DSSS signal;

a digital demodulator adapted to process output from said direct conversion module;

a Viterbi decoder operatively coupled to said digital demodulator and generating a corresponding digital output;

a source decoder processing said digital output from said Viterbi decoder and being configured to decode the digital signal encoded by said first encoder;

a second analog low pass filter; and

a digital-to-analog converter (DAC) operatively coupled between said source decoder and said second analog low pass filter, said second analog low pass filter generating an audio output corresponding to the decoded and converted digital signal;

at least one module adapted to amplify said generated audio output; and

at least one module adapted to reproduce said amplified audio output, said audio output having been wirelessly transmitted from said at least one audio source to a user without interference from other users or wireless devices.

Claim 31 (new). The wireless digital audio system of Claim 30, wherein said at least one audio amplifying module includes at least one power amplifier, said at least one power amplifier being configured to provide a low distortion audio signal output.

Claim 32 (new). The wireless digital audio system of Claim 31, wherein said at

least one audio reproducing module includes at least one headphone speaker, said at least one headphone speaker receiving said low distortion audio signal output from said at least one power amplifier.

Claim 33 (new). A wireless digital audio system, comprising:

at least one audio source;

at least one digital audio transmitter operatively coupled to said at least one audio source;

at least one audio receiver adapted for digital wireless communication with said at least one audio transmitter, each of said at least one digital audio transmitter and receiver being configured for code division multiple access (CDMA) communication; and

at least one module adapted to audibly reproduce said processed CDMA signal, said CDMA communication configuration providing a user with independent audio reproduction free of interference from other users or wireless devices.

Claim 34 (new). A wireless digital audio system, comprising:

at least one audio source;

at least one digital audio transmitter operatively coupled to said at least one audio source;

at least one audio receiver adapted for digital wireless communication with said at least one audio transmitter, each of said at least one digital audio transmitter and receiver being configured for code division multiple access (CDMA) communication;

at least one module adapted to amplify said processed CDMA signal; and

at least one module adapted to audibly reproduce said amplified signal, said CDMA communication configuration providing a user with independent audio reproduction free of interference from other users or wireless devices.

Claim 35 (new). The wireless digital audio system of Claim 14, wherein said at least one audio source provides analog output in the approximate range of 20 Hz to 20 kHz.

Claim 36 (new). The wireless digital audio system of Claim 15, wherein said at least one audio source provides analog output in the approximate range of 20 Hz to 20 kHz.

Claim 37 (new). The wireless digital audio system of Claim 33, wherein said at least one audio source provides analog output in the approximate range of 20 Hz to 20 kHz.

Claim 38 (new). The wireless digital audio system of Claim 34, wherein said at least one audio source provides analog output in the approximate range of 20 Hz to 20 kHz.

Claim 39 (new). The wireless digital audio system of Claim 14, wherein at least one of said digital audio transmitter and receiver is battery-powered.

Claim 40 (new). The wireless digital audio system of Claim 15, wherein at least one of said digital audio transmitter and receiver is battery-powered.

Claim 41 (new). The wireless digital audio system of Claim 33, wherein at least one of said digital audio transmitter and receiver is battery-powered.

Claim 42 (new). The wireless digital audio system of Claim 34, wherein at least one of said digital audio transmitter and receiver is battery-powered.

Claim 43 (new). A wireless digital audio system, comprising:

at least one audio source;

at least one digital audio transmitter operatively coupled to said at least one audio source, said at least one audio transmitter comprising:

a first analog low pass filter receiving audio output from said at least one audio source;

a digital low pass filter;

an analog-to-digital converter (ADC) operatively coupled between said first analog and digital low pass filters;

a first encoder receiving output from said digital low pass filter and being configured to reduce intersymbol interference (ISI);

a second channel encoder operatively coupled to said first encoder and adapted to reduce transmission errors;

a digital modulator operatively coupled to said second channel encoder;

and

a differential phase shift key (DPSK) module receiving output from said digital modulator and being configured for direct sequence spread spectrum (DSSS) communication, said DPSK module transmitting a corresponding DSSS signal;

at least one audio receiver configured for digital wireless communication with said at least one audio transmitter, said at least one audio receiver comprising:

a band pass filter (BPF) configured to process said transmitted DSSS signal;

a direct conversion module receiving output from said BPF and being configured to capture the correct bit sequence embedded in said processed DSSS signal;

a digital demodulator adapted to process output from said direct conversion module;

a Viterbi decoder operatively coupled to said digital demodulator and generating a corresponding digital output;

a source decoder processing said digital output from said Viterbi decoder and being configured to decode the digital signal encoded by said first encoder;

a second analog low pass filter; and

a digital-to-analog converter (DAC) operatively coupled between said source decoder and said second analog low pass filter, said second analog low pass filter generating an audio output corresponding to the decoded and converted digital signal; and

at least one module adapted to reproduce said generated audio output, said audio output having been wirelessly transmitted from said at least one audio source to a user

without interference from other users or wireless devices.

Claim 44 (new). A wireless digital audio system, comprising:

at least one audio source;

at least one digital audio transmitter operatively coupled to said at least one audio source, said at least one audio transmitter comprising:

a first analog low pass filter receiving audio output from said at least one audio source;

a digital low pass filter;

an analog-to-digital converter (ADC) operatively coupled between said first analog and digital low pass filters;

a first encoder receiving output from said digital low pass filter and being configured to reduce intersymbol interference (ISI);

a second channel encoder operatively coupled to said first encoder and adapted to reduce transmission errors;

a digital modulator operatively coupled to said second channel encoder;
and

a differential phase shift key (DPSK) module receiving output from said digital modulator and being configured for direct sequence spread spectrum (DSSS) communication, said DPSK module transmitting a corresponding DSSS signal;

at least one audio receiver configured for digital wireless communication with said at least one audio transmitter, said at least one audio receiver comprising:

a band pass filter (BPF) configured to process said transmitted DSSS

signal;

a direct conversion module receiving output from said BPF and being configured to capture the correct bit sequence embedded in said processed DSSS signal;

a digital demodulator adapted to process output from said direct conversion module;

a Viterbi decoder operatively coupled to said digital demodulator and generating a corresponding digital output;

a source decoder processing said digital output from said Viterbi decoder and being configured to decode the digital signal encoded by said first encoder;

a second analog low pass filter; and

a digital-to-analog converter (DAC) operatively coupled between said source decoder and said second analog low pass filter, said second analog low pass filter generating an audio output corresponding to the decoded and converted digital signal;

at least one module adapted to amplify said generated audio output; and

at least one module adapted to reproduce said amplified audio output, said audio output having been wirelessly transmitted from said at least one audio source to a user without interference from other users or wireless devices.

Claim 45 (new). The wireless digital audio system of Claim 43, wherein said at least one audio source provides analog output in the approximate range of 20 Hz to 20 kHz.

Claim 46 (new). The wireless digital audio system of Claim 44, wherein said at least one audio source provides analog output in the approximate range of 20 Hz to 20 kHz.

Claim 47 (new). The wireless digital audio system of Claim 43, wherein at least one of said digital audio transmitter and receiver is battery-powered.

Claim 48 (new). The wireless digital audio system of Claim 44, wherein at least one of said digital audio transmitter and receiver is battery-powered.

Claim 49 (new). The wireless digital audio system of Claim 43, wherein said at least one audio source is a portable music player.

Claim 50 (new). The wireless digital audio system of Claim 44, wherein said at least one audio source is a portable music player.

Claim 51 (new). A wireless digital audio transmitter, comprising:

a first analog low pass filter receiving audio output from at least one audio source;

a digital low pass filter;

an analog-to-digital converter (ADC) operatively coupled between said first analog and digital low pass filters;

a first encoder receiving output from said digital low pass filter and being

configured to reduce intersymbol interference (ISI);

a second channel encoder operatively coupled to said first encoder and adapted to reduce transmission errors;

a digital modulator operatively coupled to said second channel encoder;

and

a differential phase shift key (DPSK) module receiving output from said digital modulator and being configured for direct sequence spread spectrum (DSSS) communication, said DPSK module transmitting a corresponding DSSS signal.

Claim 52 (new). A wireless digital audio receiver, comprising:

a band pass filter (BPF) configured to process a transmitted DSSS signal;

a direct conversion module receiving output from said BPF and being configured to capture the correct bit sequence embedded in said processed DSSS signal;

a digital demodulator adapted to process output from said direct conversion module;

a Viterbi decoder operatively coupled to said digital demodulator and generating a corresponding digital output;

a source decoder receiving said digital output from said Viterbi decoder and being configured to decode the digital signal encoded therein;

a second analog low pass filter; and

a digital-to-analog converter (DAC) operatively coupled between said source decoder and said second analog low pass filter, said second analog low pass filter generating an audio output corresponding to the decoded and converted.

digital signal, said audio output having been wirelessly transmitted to a user without interference from other users or wireless devices.

Claim 53 (new). A wireless digital audio receiver utilizing embedded fuzzy logic to optimize digital signal processing, comprising:

- a band pass filter (BPF) configured to process a transmitted DSSS signal;
- a direct conversion module receiving output from said BPF and being configured to capture the correct bit sequence embedded in said processed DSSS signal;
- a digital demodulator adapted to process output from said direct conversion module;
- a Viterbi decoder operatively coupled to said digital demodulator and generating a corresponding digital output;
- a source decoder receiving said digital output from said Viterbi decoder and being configured to decode the digital signal encoded therein;
- a second analog low pass filter; and
- a digital-to-analog converter (DAC) operatively coupled between said source decoder and said second analog low pass filter, said second analog low pass filter generating an audio output corresponding to the decoded and converted digital signal, said audio output having been wirelessly transmitted to a user without interference from other users or wireless devices.